HYPERTENSIVE DISORDERS IN PREGNANCY AMONG WOMEN WHO ATTEND GOVERNMENT HEALTH CLINICS IN THE DISTRICT OF KUALA MUDA, KEDAH DARULAMAN

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TABLE OF CONTENTS

PAGE

LIST OF TABLES

TABLES PAGE

TABLES PAGE

LIST OF FIGURES

CHAPTER I

INTRODUCTION

Of all the periods in the life cycle, pregnancy is one of the most critical and unique. When a woman becomes pregnant, all the experiences of her past join with those of the present to lay the foundations of a new life, whose potential, in turn, will influence the welfare of generations to come. The critical place that pregnancy occupies in the chain of life has health and social importance for individual, families, and society as a whole.

The unique nature of pregnancy lies in the fact that at no other time is the well-being of one individual so directly dependent on the well-being of another. During the gestational period, the mother and child have an intimate and inseparable relationship. The physical and mental health of the mother before and during her pregnancy have profound effects on the status of her infant in utero and at birth. It is only through efforts directed at the mother herself that advantages can be provided to assure that her infant will be well born.

The vulnerability and dependence of the infant and the intergenerational significance of pregnancy in the life cycle have led all societies throughout history to recognise the

special needs of pregnant women and to make provisions for their care (1).

Although childbearing is a natural and physiological process which in the great majority of cases proceeds without serious complications but is nonetheless associated with risks either as a result of her preexisting status or condition such as her physical stature (short stature), age (the very young and older age group), parity (primigravida), the socio-economic status (low income group) or as a result of the process of pregnancy where there is a risk of developing into complications such as anaemia, antepartum haemorrhage, toxaemias of pregnancy and associated medical problem.

Eventhough childbirth is a universally celebrated event, yet it may end in sorrow and make thousands of the children motherless. In fact, maternal death and injury in childbearing process constitute a tragedy of vast proportion in certain countries in the world . This situation has existed for many years, but because childbearing is an essentially a healthy and welcome process, traditional societies have somehow accepted the risks as normal and unavoidable (2).

Virtually in all of the maternal deaths the same major killers are identified and these are haemorrhage, hypertensive disorder particurly eclampsia and infection.

In fact hypertensive disorders in pregnancy (HDP) represent one of the most common medical complications of pregnancy and is claimed to be responsible for a fifth to a third of all maternal deaths in the world (3).

The hypertensive disorders in pregnancy comprise several diseases and syndromes associated with high blood pressure and these disorders have been classified in various ways. Essentially they include the following :

a) Women who develop hypertension as a result of pregnancy with or without oedema or proteinuria. This is the more common hypertensive state of pregnancy. It occurs after the 20th weeks of gestation and the condition is termed as preeclampsia or preeclamptic toxaemia (PET) or toxaemia in pregnancy (3,4).

b) Women who have chronic hypertension and subsequently pregnant, the pregnancy state can further exarcebate the preexisting hypertension or the developing of other signs or symptoms such as oedema or proteinuria and hence are classified as chronic hypertension with supperimposed PET (5,6).

c) Both these groups (a) and (b) can deteriorate further to culminate in convulsion and coma and the condition is termed eclampsia which is the most devasting and frightening complication to any women who have hypertension in the pregnancy (6).

d) There is also another group of women with chronic hypertension and subsequently conceive but the hypertension is somehow well controlled during the pregnancy and thus does not developd any superimposed PET (6).

Therefore hypertension may antedate conception (chronic hypertension), or arise during gestation (PET) either accompanied by oedema and proteinuria and occasionally it deteriorates further to develop eclampsia (6).
Presently, the term hypertensive disorder of pregnancy is widely used to describe all these complications of hypertension during pregnancy.

There have been arguments on the use of the term toxaemia of pregnancy. Some feel that the use of the term toxaemia should be discouraged because it is misnomer and erroniously implies that a toxin circulating in the blood is the cause of an underlying aetiologic toxin which however has yet to be found (6,7). However, terms such as toxaemia in pregnancy, preeclampsia (PET), Gestational Oedeme-Proteinuria-Hypertensive Disorders (GEPH) and pregnancy-induced hypertension (PIH) are still widely used in various parts of the world to signify the hypertensive disorder of pregnancy and these terms are interchangeably used in the description of this study.

1.1 Magnitude Of The Problem Of HDP

As mentioned earlier the hypertensive disorders in pregnancy represents one of the most common medical complications of pregnancy and it affects anywhere from 0.5% to 35% of pregnant women in the world. It is claimed to be responsible for a fifth to a third of all maternal deaths in the world (3).

Incidence figures for HDP vary widely in epidemiological studies due to variations in definitions, the occurrence of risk factors and differing methods of data collection.

In a population based survey from 1958-1973 it was found that the incidence of HDP in the few selected developed countries showed that the rate varies from 2.0 to 26.0 / 100 births (in this period the incidence of eclampsia itself varies from 0.6 to 2.0 /1000 births) (3).

Whereas in another report from hospital based survey in 11 countries including developed and developing countries from 1970-77, it is seen that the incidence of HDP varies from 0.1 to 31.4 /100 births a 300 fold difference. Even in individual countries there was a 10-20 fold difference between hospital study series. During this period the incidence of eclampsia varied from 0.0 to 12 /1000 births (3).

In Malaysia, study done by Siti Norazah et al (1989) on obstretric complications in University Hospital from 1969-1987 recorded that the incidence of HDP ranged from

14% in 1969 to 2%-4% in 1981-1984. In 1987 the rate went up to 7.4% (8).

Data on population based studies in Malaysia are not readily available. However, reports on analysis of maternal deaths give us some insight over the problem of HDP in Malaysia. Morever, with the implementation of health management information system (HMIS) by Ministry of Health in 1989 we are able to gather more accurate data but this data is available only for eclampsia cases and not for HDP cases. From May to December 1989, there was a total of 93 cases of eclampsia in Malaysia giving an incidence of 4.54 /10,000 estimated livebirths, while from Jan-June 1990 there were 59 cases with an incidence rate of 3.72 /10000 livebirths (9). During this period of 1989 in Kedah state there were 10 cases of eclampsia of which the district of Kuala Muda/Yan had the highest incidence rate of 12.60 /10000 livebirths. Whereas from Jan to June 1990 the Kedah state had a total of 7 cases of eclampsia and Kuala Muda/Yan had the incidence rate of 5.53 /10000 livebirths (9).

When literature on causes of maternal mortality are reviewed, it is shown that in some developed countries, toxaemia is responsible for a tenth to a third of all maternal deaths, ranking among the first three defined causes for most countries (Table I) (3).

TABLE I: Maternal Mortality from Toxaemia in Selected Countries in 1972

Country	Maternal mortality per 100,000 live births		Ranking
	From all causes	From Toxaemia	
Chile	178.5	16.1	4
England and Wales	15.4	2.8	1
Hungary	43.1	9.1	1
Italy	46.1	11.5	1
Japan	40.6	13.4	1
Mexico	130.2	15.6	2
Poland	17.9	2.7	3
Romania	130.0	2.6	2
Spain	32.1	3.5	2
USA	18.7	3.0	2
Yugoslavia	37.0	4.8	3
Canada	15.5	5.3	1

Source: World Health Stastistics Annual, (1972).

Other studies done in some selected developing countries between 1982-1985 also show that toxemia was the single most important direct obstretric cause of maternal mortality in these countries. For example in Jamaica it accounted for 26% of such deaths, in Cali, Colombia about 34% and in Bangladesh it was responsible for between 15% to 21% of such deaths (10).

Analysis on maternal deaths in Malaysia shows that eclampsia was the third leading cause of maternal death from 1981 to 1985, while it was the fifth leading cause in the year of 1987 (Table II) (11).

Kedah is one of the states in Peninsular Malaysia which has high maternal mortality rates. Eclampsia is the second leading cause of maternal deaths from 1976 to 1988 accounting for 19.4% to 17.2% respectively of maternal deaths in Kedah (12).

For 1989, it also ranked as the second leading cause of maternal deaths accounting for 13.3% of the total maternal deaths but is at par with other causes such as embolism and septicaemia (Table III).

It can be seen now that HDP is in fact one of the leading causes of maternal deaths in majority of the countries in the world.

TABLE II : Five Leading Causes Of Maternal Mortality in Peninsular Malaysia (1981 -1987)

CAUSES	1981	1983	1985	1987
PPH with retained placenta	24.0%	21.6%	10.6%	10.6%
Post partum hemorrhage	14.4%	21.6%	21.8%	15.0%
Eclampsia and PET	13.2%	10.0%	10.2%	7.8%
Embolism	11.6%	8.8%	8.2%	11.1%
Assoc. medical complication	12.0%	2.5%	11.1%	15.0%

Source : Annual report 1981-1987, MCH Unit, Ministry of Health.

1.2 Aetiology Of HDP

It is apparent that in the case of chronic hypertension with or without superimposed PET a large number of underlying causes of hypertension can be identified. However, in the case of PET per se, many theories have been championed to explain the aetiology. Among them are those explaining the abnormalities in the placentation, the immune system, imbalance of vasoactive prostaglandins and changes in haemodynamic control mechanisms (13). These theories will not be explained here. However, it suffices to say that the aetiology of PET is still not known and hence the prevention of HDP is also not known. However, there are several risk factors which are known to be associated with HDP. With recognition of risk factors and proper management of HDP cases, the severity of HDP can be modified.

1.3 Risk Factors

Among the risk factors that have been associated with disorders of hypertension in pregnancy are the **age** and **parity.** The first pregnancies are characteristically associated with a greater risk of hypertensive complications at any age. Very early (teenage) and late (over 35 years of age) pregnancies are associated with higher risk, owing partly to essential hypertension in the second group. The rates in women over 40 years of age are highest although their contribution to the total

TABLE III : Causes Of Maternal Deaths in Kedah Darulaman Between 1976-1989

Causes of death	1976 No. (%)	1985 No. (%)	1988 No. (%)	1989 No. (%)
Retained placenta with post partum haemorrhage	20 (55.5)	11 (26.8)	5 (17.2)	1 (6.7)
Eclampsia	7 (19.4)	9 (21.9)	5 (17.2)	2 (13.3)
Maternal exhaustion	3 (8.3)	-	-	-
Antepartum haemorrhage	2 (5.6)	1 (2.4)	-	1 (6.7)
Embolism	-	3 (7.3)	4 (13.7)	2 (13.3)
Cardiac failure	1 (2.8)	-	-	4 (26.7)
Septicaemia	-	3 (7.3)	4 (13.7)	2 (13.3)

Source : Maternal and Child Health Unit, Kedah Darulaman

number of cases is small, unless grandmultiparity is a characteristic of the community (3).
A study done at Kandang Kerbau Hospital in Singapore from 1977-1978 showed that the incidence of HDP among primiparous patients was 4.42% and among multiparous it was 3.65% (14).

The second risk factor is the **personal** and **family history** where the incidence of pregnancy hypertension is greater in the daughters and sisters of those who are affected in their pregnancies. Women who have had pre eclampsia in a previous pregnancy have a 13-45% chance of being affected in the current one (3).

There is no evidence of increased susceptibility of any **racial group** other than those with a tendency to hypertension who may, therefore, show more hypertension in pregnancy (3).

HDP is also linked with **twin pregnancies**, in women who are **overweight**, and in those with **diabetes**, **hydramnios** and **hydatidiform mole** (3).

Another risk factor that seems to be associated with this disorder is **poverty**. The proverty is closely linked to a greater number of pregnancies at the extremes of reproductive age, coupled with poor medical care which delays detection. Whether there are other

components of poverty that cause or enhance HDP is likely but they remain to be defined and probably differ in different communities (3).

Season and **climate** is thought to be linked with HDP. In a study done in Nigeria it was shown that there was a seasonal distribution of eclampsia. It is more frequent in the wet season of the year than dry season with a ratio of 3.5 to 1.0 although there is no clear evidence of any aetiological role (15).

With regard to the **geographical distribution,** studies done by WHO in 1980's concluded that there are genuine differences in the incidence of hypertensive disorders of pregnancy in the populations of Southeast Asia. They showed that the incidence of hypertensive disorders varies from 1% of pregnant women in Vietnam and Thailand, and 5% in Burma, to 31% in China (16).

In another aspect it is said that **cultural patterns** and **religious beliefs** which would affect age at first pregnancy and the proportion of older multiparae, as well as food taboos affecting pregnant women, could have an effect, on the outcome of pregnancy with established HDP (3).

Lastly **health services** and in particular, **antenatal care** have the most profound effect on the consequences of

HDP. Early detection and treatment will help keep mild HDP mild and will reduce the frequency of eclampsia, low birth weight, and mortality of both infant and mother. Thus, women with little or no antenatal care or for whom skilled birth attendants are not available are at greatest risk (3).

1.4 Effect Of HDP on Maternal and Child Health

Hypertensive disorders of pregnancy have major effects on the pregnant mother, the foetus and the neonate.

For the mother with mild PET, it carries little risk other than the risk that the disease will progress to a more severe form. In severe hypertension with proteinuria, the mortality and morbidity result from multi-involvement of the organs including **cerebral complications, renal failure, liver failure, disseminated intravascular coagualtion** and **abruptio placenta** (17).

In one study on maternal complications amongst eclamptic patients seen at University of Ilorin, Nigeria between 1968 to 1987, 220 out of 788 eclamptics cases seen developed among which the following complications, febrile illness (6.6%), heart failure (4.9%), postpartum haemorrhage (3.9%), acute renal failure (3.4%), abruptio placentae (2.4%) and others such as tetanus (0.9)and hemiparesis (0.3%) (15).

The maternal mortality due to eclampsia has been presented earlier in the chapter.

The HDP contributes significantly to the **perinatal mortality** and increases the **neonatal morbidity** as it poses a serious threat to the foetus and to the newborn infant who is often delivered prematurely, either following spontaneous labour or by therapeutic termination of pregnancy (6). It is believed that the decrease in maternal placental perfusion accounts for most of the foetal mortality and morbidity associated with this disorder such as intrauterine growth retardation, prematurity and it's complication (6). Perinatal mortality in HDP is influenced by the severity as well as by duration of the disease, and the presence of proteinuria. The resultant foetal wastage is attributed usually to **prematurity** and **stillbirth** (18).

In one study to determine the role of proteinuria on pregnancy outcome in 444 hypertensive women with singleton pregnancies, it was found that the perinatal mortality was four times higher when proteinuria complicated the hypertensive pregnancies compared with those without proteinuria (19). Perinatal mortality is also higher in women with severe preeclampsia compared with that when there is mild preeclampsia or in chronic hypertension.

This is shown in a retrospective study of 261 cases at the Estern Hospital in Swedeen, that the perinatal mortality in severe preeclampsia was 5.6%, in mild preeclampsia 2.7% and in chronic hypertension was 2.1% (20).

Chan W.F (1974) in a retrospective study of the influence of the severity of toxaemia on birthweight of 516 babies delivered to toxaemic mothers showed that 68.7% infants of severe preeclampsia mothers had birthweights less than 2,500 gm compared with 14.2% of mild preeclampsia group, and in the same study the percentage of foetal loss due to perinatal death was 2.4% in mild preeclampsia, 23.4% in severe preeclampsia and 44.4% in eclampsia (18).

1.5 Preventive Aspect Of HDP

If progress is to be made in the prevention of death and disability associated with reproduction, specific factors that place women and their infants at risk must be determined and antenatal care is one of the most effective health interventions for the above prevention.

Antenatal care has an important and potentially life-saving function in the detection and management of PET and eclampsia. This condition can be detected at an early stage by periodically measuring the blood pressure, regular testing of urine for albumin, examining for swelling of the tissue, especially pitting

oedema of the lower leg, detecting any sudden increase in weight, or taking note of warning symptoms such as severe headache, blurring of vision or vomiting (21).

Data from Sweden reveal that in the period 1950-55 about 14% of pregnant women suffering from hypertensive disorder of pregnancy died compared with only 3% in 1971-80 and the steep decline is attributed to the result of better antenatal care and treatment of women with early sign of toxaemia (10).

In United States where the maternal mortality rate associated with this problem of hypertension has fallen from 52.2 per 100,000 live births in 1940 to 6.2 per 100,000 in 1970. Factors affecting this decline include improved antepartum care with the early detection of hypertension followed by aggressive management, and the improved general health, nutrition and socioeconomic status of the gravid population (22).

In Malaysia, the antenatal services in the rural areas are provided through a network of rural health facilities.

In the urban areas besides the services being provided by the government, the private sector too provides the services to the urban population.

Records show that in 1987, 62.9% of pregnant women attended qovernment health clinics and in 1988 there is

some improvement in the percentage to 67.9% with an average of 6.5 antenatal visits per pregnancy (9). Inspite of the relatively good infrastructure and antenatal care, eclampsia is still one of the concerns of the Ministry of Health. In order to reduce the problem of eclampsia, it is taken as one of the indicators of the quality of care in the quality assurance program (QAP) started by the Ministry in October 1990 (23).

The district which has the incidence rate exceeding the target set by the ministry is classified as an outlier district and remedial actions are expected to be taken by the district in order to minimise the problems. The target set is the incidence of eclampsia should not exceed 10 /10000 live births.

Kuala Muda district was one of the outlier districts in Kedah in 1989 (by the definition of Ministry of Health with their set target) although in 1990 the incidence of eclampsia in the district is less compared to the target set at the national level. In order to reduce this problem it is important to identify high risk mothers, and know their health seeking behaviour so as to provide prompt and appropriate management.

In Malaysia, very few community based studies are done on pregnant women with HDP. Most of the data available are hospital based. Therefore, the author decided to

study pregnant women with HDP in a rural setting and chose to study antenatal mothers attending government health clinics in the district of Kuala Muda.

CHAPTER II

OBJECTIVES

2.1 General objectives

To study the incidence of HDP and profile of women with HDP who attend the government health clinics in the district of Kuala Muda.

2.2 Specific objectives

With reference to women who attend government health clinics in the district of Kuala Muda:

1) To describe the following socio-demographic characteristics of women having hypertensive disorder in pregnancy (HDP):
   - (a) age
   - (b) parity
   - (c) ethnicity
   - (d) social status

2) To find out the incidence of HDP among women with regard to:
   - (a) ethnicity
   - (b) parity
   - (c) age

3) To describe the distribution and proportion of women with HDP with regard to the preexisting or associated risk factors in HDP

4) To describe the type and severity of the HDP in women with HDP

5) To describe the antenatal care seeking behaviour of women with HDP with regard to:

   (a) period of gestation of first antenatal visit

   (b) total number of antenatal visits

   (c) total number of antenatal visits during the last two months of pregnancy

6) To describe the characteristics of delivery in terms of:

   (a) place of delivery

   (b) mode of delivery

7) To determine the foetal outcome in mothers with HDP in relation to the following:

   (a) severity of HDP

   (b) period of gestation of onset of HDP in pregnancy

   (c) occurance of proteinuria

   (d) gestation at termination of pregnancy

8) To describe the maternal outcomes in women with HDP

9) To draw conclusions and make recommendations if any based on the findings to improve management and outcome of HDP

CHAPTER III

BACKGROUND INFORMATION OF STUDY AREA

3.1 Location

The district of Kuala Muda is one of the eleven administrative districts in Kedah and is located on the central part of the state, border to the south by district of Seberang Perai Utara whereas to the north and east by the district of Yan, Pendang, Kulim, Baling and Sik (Figure 1).

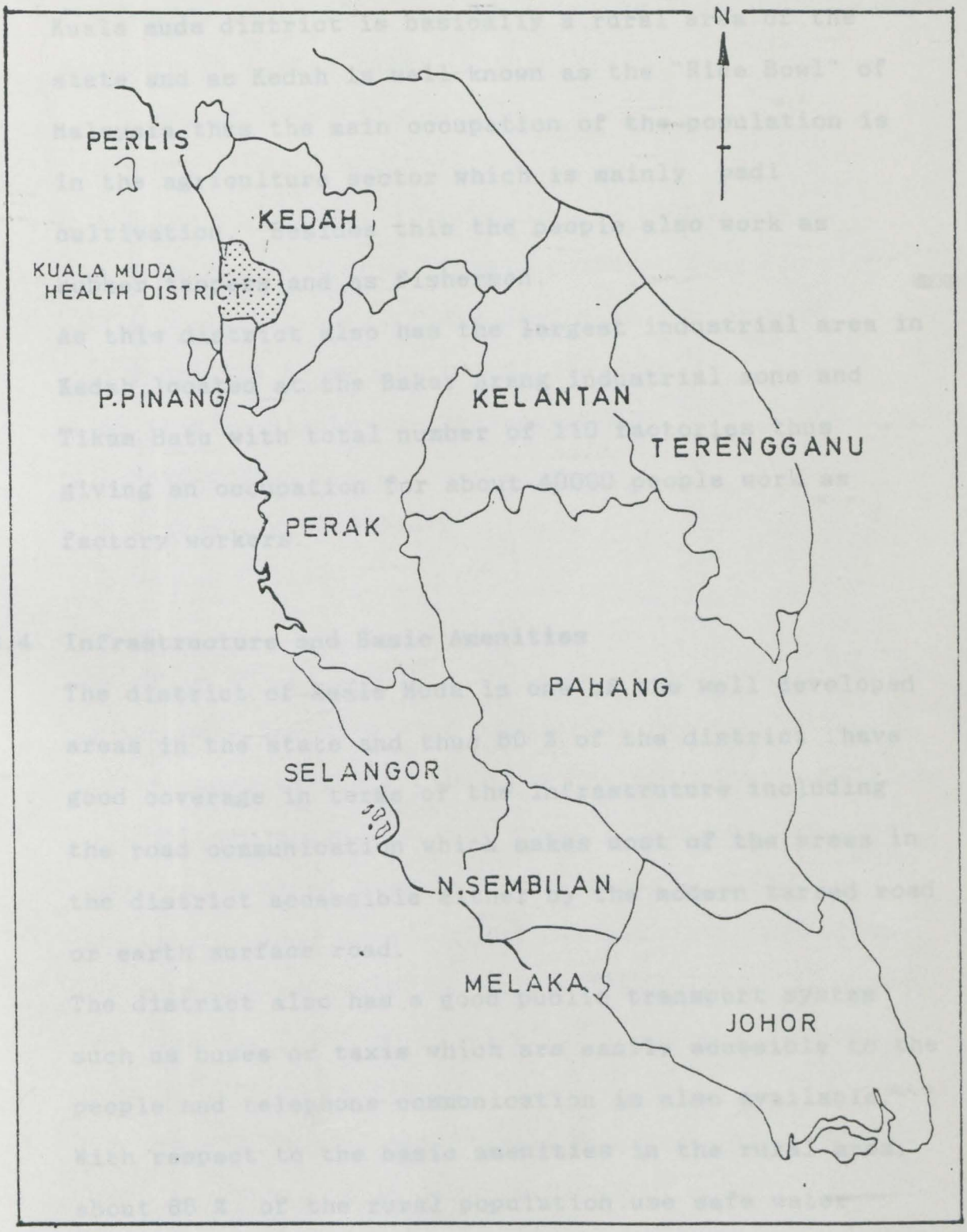
It covers an area of 1014.96 sq.km or 92200 hectares and is divided into 16 *mukims* and 324 *kampongs* and the *mukims* are under the administration of 12 *penghulus* who are directly responsible to the district officer on the welfare of their *mukims*.

3.2 Population

It has a total population of 219157 with the majority of the population being Malay contributing for 60.0% followed by Chinese 24.3% ,Indian 15.8% and other 0.8%.The female to male ratio is about the same.The district of Kuala Muda has the third highest population density in Kedah at 251 people per sq.km.

Majority of the people are rural based compared to the urban in the ratio of 3:1.

FIGURE 1 : PENINSULAR MALAYSIA - Showing the location of Kuala Muda Health District



3.3 Occupation

Kuala muda district is basically a rural area of the state and as Kedah is well known as the "Rice Bowl" of Malaysia thus the main occupation of the population is in the agriculture sector which is mainly padi cultivation. Besides this the people also work as rubber tappers and as fishermen.

As this district also has the largest industrial area in Kedah located at the Bakar Arang industrial zone and Tikam Batu with total number of 110 factories thus giving an occupation for about 40000 people work as factory workers.

3.4 Infrastructure and Basic Amenities

The district of Kuala Muda is one of the well developed areas in the state and thus 80 % of the district have good coverage in terms of the infrastruture including the road communication which makes most of the areas in the district accessible either by the modern tarred road or earth surface road.

The district also has a good public transport system such as buses or taxis which are easily accesible to the people and telephone communication is also available.

With respect to the basic amenities in the rural area, about 68 % of the rural population use safe water supply and 57 % have good hygienic latrines.

3.5 Maternal and Child Health Facilities

The health facilities available in the district of Kuala Muda are as listed below (Figure 2):

1 District Hospital

1 District Health Office

1 Maternal and Child Health Clinic (MCHC)

4 Main Health Centre (*Pusat Kesihatan Besar*)

2 Subhealth Centre (*Pusat Kesihatan Kecil*)

6 Community Nurse Clinic (*Klinik Desa*)

15 Midwife Clinic-cum-Quarter (MCQ)

1 Mobile Team

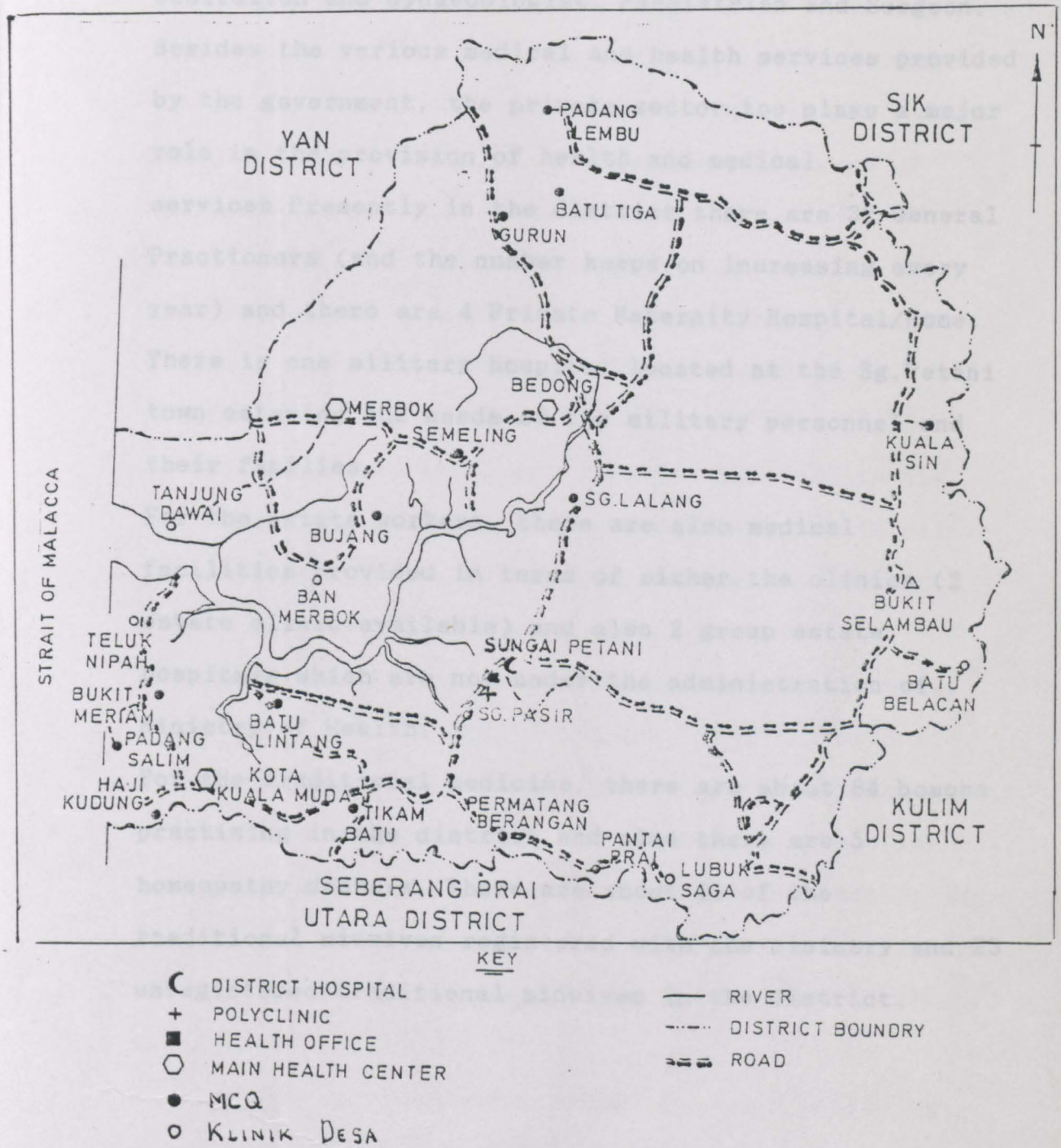
3 Travelling Dispensary

5 Dental Clinic

The ratio of the manpower in terms of medical personnel is in the ratio of 1:7619 population for the medical officer whereas the medical and health officer (M&HO) is 1:38099 population. For the community nurse (*jururawat desa*) and trained midwife the ratio is 1:6439 population. This does not yet reach the target set by the ministry of health where the target is to provide one M&HO for 20000 rural population and one *jururawat desa* to 2000 population.

The nearest general hospital is the Alor Setar General Hospital, about 65 km from Sg.Petani district hospital. Even though the hospital at the Sg.Petani (which is the second largest town in Kedah after Alor Setar) is only a

Figure 2: Location of Health Facilities in Kuala Muda District



district hospital but it has clinical specialists in various fields including a Physician, Opthalmologist, Obstretion and Gynaecologist, Paediatrian and Surgeon. Besides the various medical and health services provided by the government, the private sector too plays a major role in the provision of health and medical services.Presently in the district there are 32 General Practioners (and the number keeps on increasing every year) and there are 4 Private Maternity Hospital/Home. There is one military hospital located at the Sg.Petani town catering the needs of the military personnel and their families.

For the estate workers, there are also medical facilities provided in terms of either the clinics (2 estate clinic available) and also 2 group estate hospitals which are not under the administration of Ministry of Health.

For the traditional medicine, there are about 84 bomohs practising in the district and also there are 5 homeopathy doctors. There are about 20 of the traditional midwives registered with the ministry and 23 unregistered traditional midwives in the district.

3.6 Maternal and Child Health Services

Maternal and child health services are provided through a net work of rural health services based on a three/two tier system whereby there is a midwife clinic/ community clinic for 2000 / 4000 population, a health centre for 20000 / 50000 population. A comprehensive range of services are provided to mothers and children.

The antenatal care for the expectant mothers in the district is provided by either the government clinics (*Klinik Desa*, MCQ, MCHC and others) or by the private clinics.

In the rural area the first line of contact with the antenatal care services at the qovernment health clinic is at either the MCQ by the trained midwife or at the *Klinik Desa* by the *jururawat desa*.

When the pregnant mother first comes to the antenatal clinic, she will be registered and interview on her background especially with regard to her obstretric history. The history taking will not be complete without asking about any medical and family history that is of significant to the present pregnancy state especially with regard to family history of and history of chronic hypertension.

Simple laboratory investigations ares done including urine testing for sugar and albumin, blood for haemoglobin level and also for grouping and VDRL.

Subsequently she is then subjected to physical examination and at this junction the opportunity is taken in giving health educations to the mother. Nutritional suplement is given in term of haematinics and vitamins.

The next appointment depending on her stage of pregnancy are given and also appointment for the routine checkup by the medical and health officer (M&HO) at the main health centre.

With regard to the higk risk mothers including HDP the Ministry of Health have started the High Risk Approach in early 1980's in order to give more attention and priority to these group of mothers. Under this approach mothers with identified risk factors are monitered and supervise more closely.

To improve the quality of care, the Ministry of Health have introduced in September 1990 Quality Assurance Programme (QAP) with ultimate aim that all the activities will be routinely monitered using specific indicators with target set at the national level. Hopefully this will help in identification of any shortfalls in quality and appropriate remedial measures instituted in the districts.

In the family health programme, one of the indicator being choose to monitor the antenatal care is the eclampsia rate.

Any district with the rate of 10 / 10000 live births are classified as the outlier district and to implement remedial action based on the results of investigation .

3.7 Maternal and Child Health Coverage

The antenatal coverage for the district has been fairly good where it is usually ranges from 86.9% in 1984 to 93.9% in 1988 and the average number of antenatal visits by the mother to the clinic ranges from 7.2 to 6.8 per mother per pregnancy.

With regard to delivery, majority of the pregnant women have safe method of delivery (98.5%), either delivered by the trained personnel at home or hospitals.

Eventhough the district has 4 private maternity homes and some of these who delivered here never had any registration at any of the health government clinics. This group contribute only 10%-15% for the total pregnancies in the district.

CHAPTER IV

METHODOLOGY AND LIMITATIONS OF THE STUDY

4.1 Study Design

This is a descriptive crosssectional study of pregnant women with hypertensive disorders who attend government antenatal clinics in the district of Kuala Muda. The variables studied include socio demographic characteristics of the pregnant women with the hypertensive disorder, the risk factors that are either predisposed or associated with the disorder, the maternal and foetal outcome and some of the factors related to the outcome and lastly on some aspects of their antenatal care. All the data obtained were secondary in nature from clinic records and antenatal cards from all the government clinics in the district.

4.2 Study Area

The district of Kuala Muda was chosen as the study area. This was for two reasons. Firstly, the author had worked there for about one year in the health office and was therefore familiar with the staff and the facilities, and hence the author could be assured of easy access to the facilities and good cooperation from the staff. Secondly, this district, as mentioned earlier was the outlier for the eclampsia in 1989, eventhough in 1990 it

was not included as the outlier district but nevertheless it is still important to study the high risk group of hypertensive disorders in pregnancy in the district.

4.3 Study Population.

All pregnant women with hypertensive disorders of pregnancy who had registered at the government health clinics in the district for their antenatal checkup either at the *Klinik Desa*, midwives clinics, polyclinic, maternal and child health centre (MCHC) and health centres and had delivered during the period of Jan-Nov 1990 are included in the study. This population was chosen because the subjects would have completed their pregnancy and would have experianced maternal and foetal outcome. Pregnant women with HDP are those whose blood pressure exceeded 130/90 mmHg anytime during the pregnancy or who developed eclampsia or who had pre existing chronic hypertension with or without superadded or superimposed PET. Each pregnant woman who registers at the antenatal clinic is given an antenatal card and this card is kept in the respective clinic. All the cards from each clinic were gathered and those women who delivered between Jan-Nov 1990 were identified. There were a total of 4284 such cards. From these cards, cards which were tagged either yellow or red were picked up, and were reviewed to ensure that the cards were

those of mothers who had HDP. There were a total of 108 such cards and were all included in this study.
A countercheck with HMIS book, KIB 102 which registers all the maternal complications during pregnancy revealed that a total of 21 cards were not available either because they were misplaced, missed or the cards were transferred out as the patients had the antenatal visit elsewhere.

4.4 Study Period

The study design and proposal were prepared during the period of September to November 1990. Review of the literature was also done during this period. Permission to carry out this study was obtained from the State Director of Medical and Health Services, Kedah Darulaman. The actual survey was conducted for a period of two weeks from 16-30th December 1990.

4.5 Method of Data Collection

A prepared masterchart was used to extract the data and information from each of the antenatal card.
Information needed on distribution of pregnant women in the district with regard to their age, ethnicity and parity were obtained from HMIS registration book for each clinic i.e KIB 101. This was done wih the help of the nursing staff. A briefing was given to them before the data collection started. With regards to the

background information of study area, the annual report from the health office together with the report on profile of Kuala Muda district from the district office were reviewed.

4.6 Data Processing and Analysis

Using a prepared masterchart , the data obtained was processed and analysed with the computer using Dbase III plus and Epiinfo Version 5.0 programme. The test of significance applied is Chi-square with Yates correction. The Fisher's test is used as an alternative procedure when the Chi-square is not applicable.

4.7 Operational Definitions

The operational definitions or terms used in the study are listed and explained in Appendix I.

4.8 Sources of Error and Limitations of the Study

As all the information obtained was from secondary data extracted from the antenatal cards, the reliability and accuracy of this data cannot be assessed particurlarly as the data entered into the cards may be incomplete or inaccurate. This includes firstly, the nursing staff might not have taken the detailed medical and family history and thus missed any of the important risk factors associated with HDP.

Secondly, some of the information required for the study might not be recorded at all, especially information on the maternal morbidity. The nursing staff sometimes during the post natal visits do not bring the antenatal cards along and they forgotten to record the findings on the cards.

Thirdly, errors in measurement of blood pressure, the important component of diagnosing HDP either resulting from the faulty apparatus or from inaccurate reading of measurement by the personnel involved can lead to misdiagnosing of the cases.

Errors also can occur in the counting the total antenatal visits especially for the last two months as some of the pregnant mothers go to private clinics for the checkup and not confine themselves only to the government clinics. Such visits are not recorded on their cards.

The study is not a true representation of hypertensive disordes in pregnancy in the Kuala Muda district as it excludes mothers who do not come to government clinics.

Some of the cards were misplaced and no attempt was made to trace these cards.

Errors in data entry and retrival should also be borne in mind.

Hence, the interpretation of the findings of this study will have to be within the context of these limitations.

CHAPTER V

FINDINGS

5.1 Incidence of HDP and Characteristics of Women with HDP

5.1.1 Incidence

Review of antenatal cards of 4284 women who delivered between Jan-Nov 1990 in the district of Kuala Muda showed that 108 of them had HDP giving an incidence rate of 2.5%.

5.1.2 Ethnicity

Of 108 women with hypertensive disorders of pregnancy (HDP) majority are Malays 97 (89.8%), followed by Chinese 8 (7.4%) ,Indians 2 (1.9%) and Siamese 1 (0.9%).

When incidence rate is calculated according to ethnicity, Table IV shows that the highest incidence rate is among the Malays (3.3%) compared with Chinese (1.4%), Indians (0.3%) and others (2.4%). The statistical test shows that Malays have higher incidence of HDP compared with others ($p < 0.01$).

5.1.3 Age

With regard to the incidence rate by age, it is higher (1.8%) in women below 19 years old than those in the age group of 20-24 (1.0%) who have the lowest rate.

Table IV : Distribution of Number and Percentages of women with HDP by Ethnicity in Kuala Muda District

	MALAY	CHINESE	INDIANS	OTHERS	TOTAL
NO. OF WOMEN WITH HDP (%)	97 (3.3%)	8 (1.0%)	2 (0.3%)	1 (2.4%)	108 (2.5%)
NO. OF WOMEN WITHOUT HDP (%)	2804 (96.7%)	761 (99.0%)	570 (99.7%)	41 (97.6%)	4176 (97.5%)
TOTAL (%)	2901 (100%)	769 (100%)	572 (100%)	42 (100%)	4284 (100%)

Thereafter, the incidence rate increase progressively as the age increases, highest being 8.7% in women older than 40 years old (Figure 3).

Nearly half, that is 46 (42.6%) out of 108 women with HDP are in the age group above 35 years old (where 12.0% of this percentage are in fact between 40 to 45 years old).

As can be seen from table V, women above 35 years old have a higher incidence of HDP (6.7%), which is more than compare with that in women below 35 years old (1.7%). Statistically this difference is significant ($p < 0.01$).

5.1.4 Parity

The multiparity (parity 1-4) constitutes 41.7% of the study population followed by grandmultiparity (parity ranging from 5-8) 35.2%. Primiparity contributes for 20.4% and greatgrandmultiparity with parity of more than 9 consists of 2.8% of study population (Figure 4).

Table VI shows that incidence rate of HDP in primiparity is 1.9% compared with the rate of HDP in multiparity is 2.8%. However statistically it is not significant ($p > 0.05$).

5.1.5 Occupation

Majority of the pregnant mothers are housewives (75%), others are rubber tappers (7.4%), factory workers

Fig 3: Percentages of women with HDP in relation to Age group.

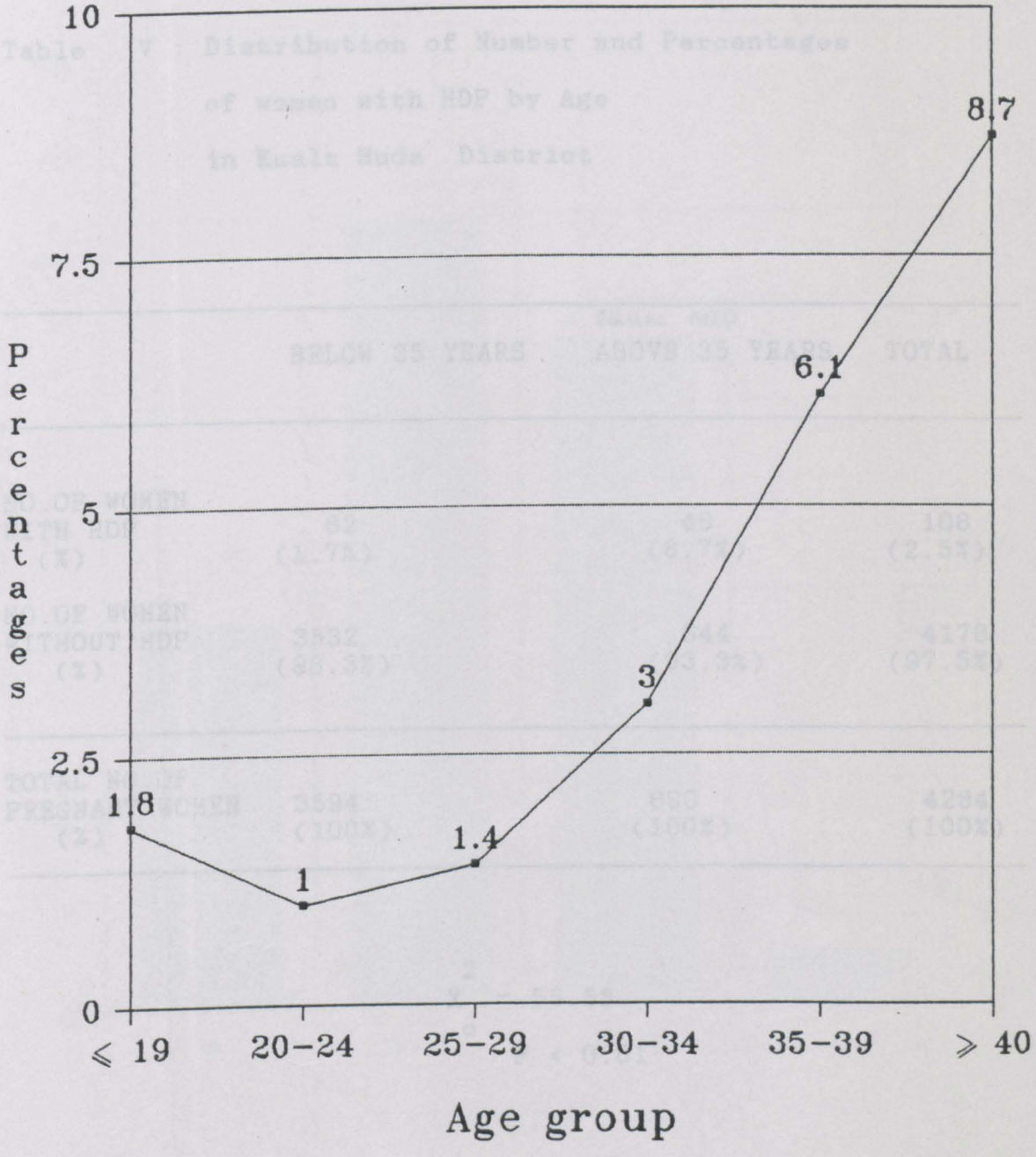


Table V : Distribution of Number and Percentages of women with HDP by Age in Kuala Muda District

	BELOW 35 YEARS	EQUAL AND ABOVE 35 YEARS	TOTAL
NO.OF WOMEN WITH HDP (%)	62 (1.7%)	46 (6.7%)	108 (2.5%)
NO.OF WOMEN WITHOUT HDP (%)	3532 (98.3%)	644 (93.3%)	4176 (97.5%)
TOTAL NO.OF PREGNANT WOMEN (%)	3594 (100%)	690 (100%)	4284 (100%)

$$X_c^2 = 55.53$$

$$P < 0.01$$

Fig 4: Percentages of women with HDP in relation to Parity.

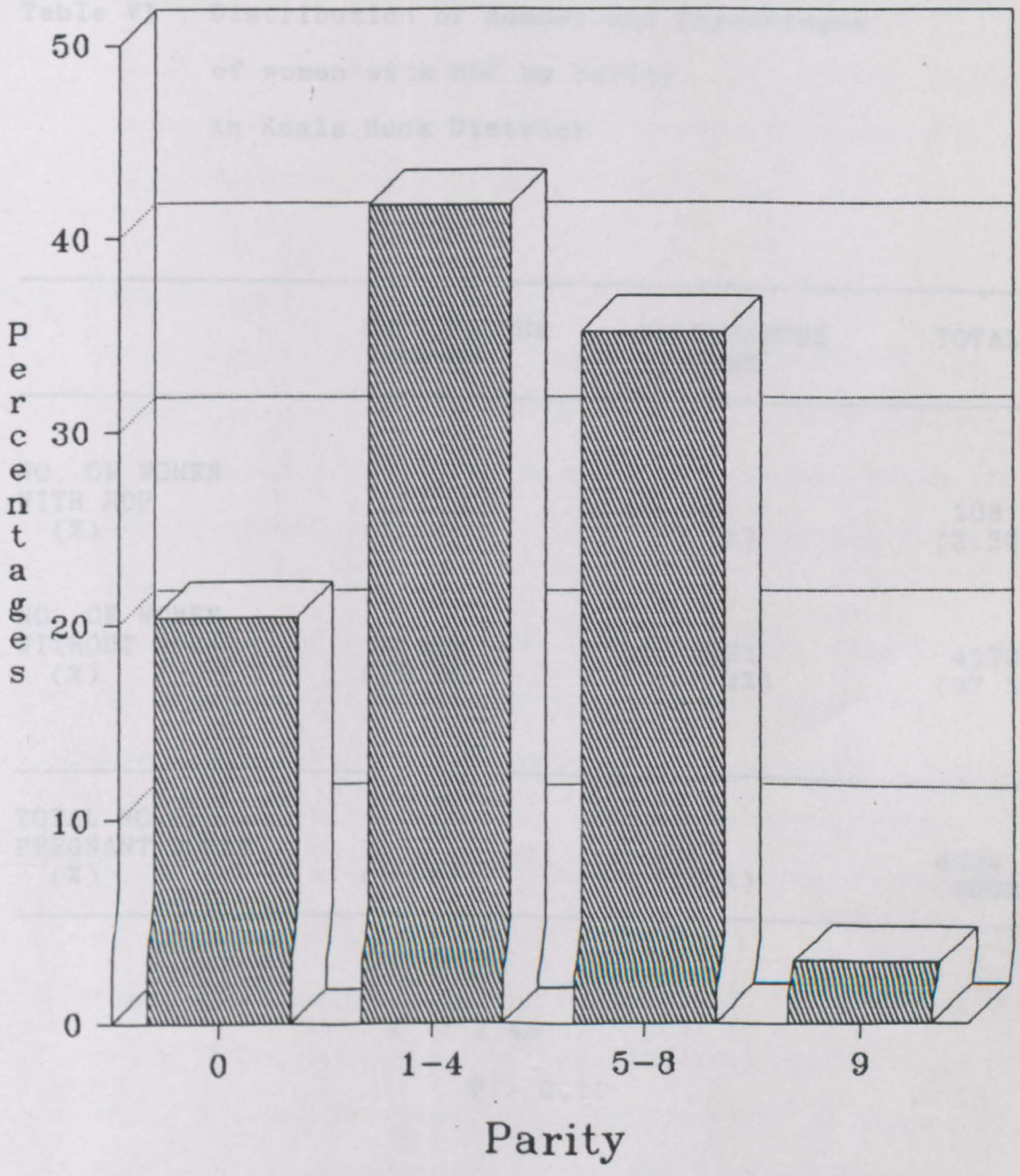


Table VI : Distribution of Number and Percentages of women with HDP by Parity in Kuala Muda District

	PRIMIPAROUS WOMEN	MULTIPAROUS WOMEN	TOTAL
NO. OF WOMEN WITH HDP (%)	22 (1.9%)	86 (2.8%)	108 (2.5%)
NO. OF WOMEN WITHOUT HDP (%)	1155 (98.1%)	3021 (97.2%)	4176 (97.5%)
TOTAL NO.OF PREGNANT WOMEN (%)	1177 (100%)	3107 (100%)	4284 (100%)

$$X^2 = 2.45$$

$$P > 0.11$$

(6.5%) self-employed (6.5%) and teachers (4.6%) (Table VII).

Whereas their husbands work as either fishermen or farmers (20.4%), police or army personnel (16.7%), labourers (13.0%), self-employed (11.1%), lorry drivers (9.2%), factory workers (8.3%), rubber tappers (7.4%), teachers (2.8%). The rest are clerks, techinicians, carpenters, cooks (11.1%) (Table VIII).

5.2 Risk Factors

With regards to the risk factors, 86 (79.6%) of the women had one or more of risk factors that are listed in table IX. The common risk factors are extremes of age at childbearing especially women above 35 years old who are 46 in numbers.

This group of mothers also had additional risk factors: 10 of them were known cases of chronic hypertension, 12 had past history of PET or eclampsia. Another common risk factor is primiparity, 22 of the mothers were primiparas, among them 2 had an additional risk factor of family history of hypertension,

Those who had past history of PET or eclampsia were 21 while those with chronic hypertension were 17 cases of which 5 cases developed superimposed PET. 3 cases had family history of hypertension and risk factor that emerged during the pregnancy such as multiple pregnancy was in one case.

Table VII : Distribution of women with HDP by Type of Occupation in Kuala Muda District

TYPE OF OCCUPATION	NO.OF WOMEN WITH HDP	PERCENTAGE
Housewife	81	75.0%
Rubber tappers	8	7.4%
Factory workers	7	6.5%
Teachers	5	4.6%
Others	7	6.5%
TOTAL	108	100%

Table VIII : Distribution of husbands by Type of Occupation in Kuala Muda District

TYPE OF OCCUPATION	NO.OF HUSBANDS	PERCENTAGE
Fisherman/farmer	22	20.4%
Police/army	18	16.7%
Labourer	14	13.0%
Self-employed	12	11.1%
Lorry drivers	10	9.2%
Factory workers	9	8.3%
Rubber tappers	8	7.4%
Teacher	3	2.8%
Others	12	11.1%
TOTAL	108	100.0%

Table IX : Type of Risk Factors in women with HDP in Kuala Muda District

TYPE OF RISK FACTOR		FREQUENCY OF RISK FACTORS
Extreme of age		49
Above 35 years	46	
Below 19 years	3	
Primigravida		22
Past history of PET/Eclampsia		21
Known case of Chronic hypertension		17
Family history of hypertension		3
Multiple pregnancy		1
TOTAL		113*

* Number of risk factors in 86 women with HDP

5.3 Type and Severity of HDP

5.3.1 Type of HDP

Of 108 cases, majority or 89 (82.4%) of them have preeclampsia, 17 (15.7%) of them are chronic hypertension. Of the 17 cases of chronic hypertension, 5 of them have superimposed PET and the rest of 12 cases are without any superimposed PET. There are however, only two (1.9%) cases of eclampsia (Table X).

5.3.2 Severity of HDP

Majority of the pregnant women, 75 (70.8%) of them are classified as mild HDP with the diastolic blood pressure of 90-99 mmHg, followed by 19 (17.9%) who have moderate HDP with diastolic blood pressure between 100-109 mmHg with or without proteinuria, and 12 (11.3%) are severe HDP with diastolic blood pressure of above 110 mmHg with or without proteinuria (Table XI).

5.4 Antenatal Visits by women with HDP

5.4.1 Period of gestation at first antenatal visit

Majority of the mothers, (74.1%) made first antenatal visit to the clinic during their second trimester (15-27 week) (Table XII).

During the first trimester (below 14 weeks) only 7.4% made their antenatal visits to the clinic and the earliest visit made was on the 9th week of gestation.

Table X : Distribution of women by Type of HDP in Kuala Muda District

TYPE OF HDP	NO. OF WOMEN	PERCENTAGE
Preeclampsia (PET)	89	82.4%
Chronic hypertension	12	11.1%
Chronic hypertension with superimposed PET	5	4.6%
Eclampsia	2	1.9%
TOTAL	108	100%

Table XI : Distribution of women by Severity of HDP in Kuala Muda District

SEVERITY	NO. OF WOMEN	PERCENTAGE
MILD	75	70.8%
MODERATE	19	17.9%
SEVERE	12	11.3%
TOTAL	106*	100%

*Two of the cases the diastolic blood pressure never reached above 90mmHg but developed eclampsia in the intrapartum period

MILD - diastolic blood pressure of 90-99mmHg

MODERATE - diastolic blood pressure of 100-109mmHg

SEVERE - diastolic blood pressure of 110mmHg or more

In the presence of proteinuria, the severity was classified one grade higher than that based on blood pressure alone

Table XII : Distribution of women with HDP by Period of Gestation at First Antenatal Visit in Kuala Muda District

PERIOD OF GESTATION OF FIRST ANTENATAL VISIT	NO. OF WOMEN	PERCENTAGES
First trimester (below 14 weeks)	8	7.4%
Second trimester (15-27 weeks)	80	74.1%
Third trimester (above 28 weeks)	20	18.5%
TOTAL	108	100.0%

The rest of the cases (18.5%) made their visit in the third trimester (after 28 weeks) as late as at 32 weeks of gestation.

5.4.2 Total number of antenatal visits

The number of visits made by each pregnant woman during the entire pregnancy ranged from 2-17 visits. It can be seen from the table XIII that the highest frequency of the total number of antenatal visits are in the range of 6-10 visits accounting for 53.8% of the women followed by 1-5 visits by 29.6% of the women. About 15.7% of women made 11-15 visits and 0.9% made more than 17 visits.

5.4.3 Total number of antenatal visits during the last 2 months of pregnancy

The number of antenatal visits done during the last 2 months of pregnancy ranges from 0 to 10 visits per mother but majority of them (63.0%) made between 4 to 7 visits to the clinics (Table XIV). The 0 visit denotes that there is no visit done during the last 2 months of the pregnancy.

Table XIII : Distribution of women with HDP by Total number of visits to antenatal clinics in Kuala Muda District

NO. OF VISITS	NO. OF WOMEN WITH HDP	PERCENTAGE
1-5	32	29.6%
6-10	58	53.8%
11-15	17	15.7%
> 17	1	0.9%
TOTAL	108	100%

Table XIV : Distribution of women with HDP by Number of antenatal visits during the Last Two Months of pregnancy in Kuala Muda District

TOTAL NO.OF VISITS	NO.OF WOMEN WITH HDP	PERCENTAGE
0-3	34	31.5%
4-7	68	63.0%
>8	6	5.5%
TOTAL	108	100%

5.5 Characteristics of delivery

5.5.1 Place of delivery

Very encouraging to see that 90.7% of the mothers delivered in the hospital and only 9.3% of them delivered at home eventhough ideally all of them being high risk mothers should be delivered at the hospital.

5.5.2 Mode of delivery

For the method or mode of delivery, majority of the cases had spontaneous vaginal delivery (SVD) 85.2%, followed by delivery by Caesarion section (LSCS) 11.1%, delivered by Nevilles-Barnes Forcep (NBF) 0.9% and 1.9% had ventouse extraction. There is also one case of assisted breech delivery (Table XV).

The one case of NBF was done for intrapartum eclampsia whereas ventouse extraction was done for poor maternal effort with big babies.

5.6 Foetal Outcome

A total of 108 live infants were delivered (106 singletons and one set of twins) during the period of Jan-Nov 1990 to the women with HDP. There was one abortion in the mother who had severe HDP with blood pressure of 160/110 mmHg at the period of gestation of 27 weeks. Out of 108 live infants delivered, 84 (77.1%) were normal, whereas 24 had poor outcome (Table XVI).

Table XV : Distribution of women with HDP
by Mode of Delivery in Kuala Muda District

MODE OF DELIVERY	FREQUENCY	PERCENTAGE
SVD	92	85.2%
LSCS	12	11.1%
NBF	1	0.9%
VENTOUSE EXTRCTION	2	1.9%
ASSISTED BREECH	1	0.9%
TOTAL	108	100.0%

SVD - Spontaneous vaginal delivery

LSCS - Lower caesarian section

NBF - Nevilles-barnes forcep

Table XVI : Types of Foetal Outcome
to women with HDP
in Kuala Muda District

TYPE OF FOETAL OUTCOME		NO.OF FOETAL OUTCOME	PERCENTAGE
NORMAL		84	77.1%
POOR FOETAL OUTCOME		25	22.9%
	Abortion	1	
	Perinatal death	1	
	Prematurity	19*	
	Low birth weight	16	
TOTAL		109**	100%

* Out of the 19 infants born prematurely, 11 of them are of low birth weight.
One of the premature infant died at the age of one week old (perinatal death).

** 108 mothers delivered 107 singletons and one set of twin

Most of the poor foetal outcome is attributed to the prematurity (infants that are delivered before 37 weeks of gestation) and low birth weight (birth weight of less than 2500gm).

There were 19 premature infants of which 11 of them have low birth weight. There were another 5 low birth weight infants among the fullterm or term newborns. One of the premature baby died (delivered at 32 weeks of gestation) at the age of one week resulting in one perinatal death.

5.6.1 Relationship between foetal outcome and severity of HDP

Of the 12 infants delivered to the mothers with severe HDP, more than half or 58.4% resulted in poor outcome compared with poor foetal outcome in mild and moderate form of HDP (19.7% and 15.8% respectively). The difference is statistically signifacant ($p < 0.01$) (Table XVII).

5.6.2 Relationship between foetal outcome and period of gestation at onset of hypertension

Table XVIII shows that of 38 women who developed HDP before 28 weeks of gestation, 15 (39.5%) had poor foetal outcome compared with 10 (14.1%) of those who developed HDP after the 28 weeks of gestation. The difference is statistically significant ($p < 0.01$).

Table XVII : Number and Percentage of mothers with HDP by Type of Foetal Outcome and Severity of HDP

TYPE OF FOETAL OUTCOME	SEVERITY OF HDP			TOTAL
	Mild No (%)	Moderate No (%)	Severe No (%)	
NORMAL	61 (80.3)	16 (84.2)	5 (41.6)	82*
POOR OUTCOME	15 (19.7)	3 (15.8)	7 (58.4)	25
TOTAL	76 (100%)	19 (100%)	12 (100%)	107

* two infants of Eclamptic mothers not included

Fisher exact test with $p < 0.01$
(the test done between the severe form and combination of mild and moderate form)

Table XVIII : Distribution of women with HDP by Type of Foetal Outcome and Gestation at onset of Hypertension

TYPE OF FOETAL OUTCOME	WOMEN BY GESTATION AT ONSET OF HYPERTENSION		TOTAL
	< 28 Weeks No. (%)	>28 Weeks No. (%)	
NORMAL	23 (60.5)	61 (85.9)	84
POOR FOETAL OUTCOME	15 (39.5)	10 (14.1)	25
TOTAL	38 (100)	71 (100)	109

$$X_c^2 = 7.65$$

$$p < 0.01$$

5.6.3 Relationship between foetal outcome and occurance of proteinuria

It can be seen from table XIX that out of the 14 mothers with HDP who had at one time or the other proteinuria during the pregnancy, 6 (42.9%) had poor foetal outcome compared with 19 (20.0%) of the 95 women who did not have proteinuria. The test of significance shows that p =0.05.

5.6.4 Relationship between foetal outcome and period of gestation when pregnancy was terminated

Table XX show that the 20 (100%) of infants delivered before 36 weeks of gestation resulted in poor outcome compared with those delivered after 36 weeks of gestation. This difference is statistically highly significant (p <0.00).

5.7 Maternal Outcome

There was no maternal death in 108 cases studied, but 2 cases had intrapartum eclampsia. No other maternal morbidity such as renal failure or abruptio placenta were recorded.

Profile of the mothers with eclampsia is given in table XXI. Both are Malay housewives and they are 23 and 24 years old. Both are primiparas and had first antenatal booking in the first trimester, and attended antenatal clinics 10 and 11 times respectively.

Tables XIX : Distribution of women with HDP with or without Proteinuria by Type of Foetal Outcome

TYPE OF FOETAL OUTCOME	WOMEN WITH HDP		TOTAL
	PROTEINURIA PRESENT No. (%)	PROTEINURIA ABSENT No. (%)	
NORMAL	8 (57.1)	76 (80.0)	84
POOR FOETAL OUTCOME	6 (42.9)	19 (20.0)	25
TOTAL	14 (100.0)	95 (100.0)	109

Fisher exact test p = 0.05

Table XX : Distribution of women with HDP by Period of Gestation at Termination of pregnancy and Type of Foetal Outcome

TYPE OF FOETAL OUTCOME	WOMEN WITH HDP AT PERIOD OF GESTATION AT TERMINATION		TOTAL
	< 36 Weeks No. (%)	> 36 Weeks No. (%)	
NORMAL	0 (0)	84 (94.4)	84
POOR FOETAL OUTCOME	20 (100.0)	5 (5.6)	25
TOTAL	20 (100.0)	89 (100.0)	109

Fisher exact test $p < 0.00$

Table XXI : Clinical Summary Of Eclamptic Mothers In Kuala Muda District

	First Case	Second Case
Name :	Nazaih Ahmad	Fadhillah Md Saad
Race :	Malay	Malay
Age :	23 years	24 years
Parity :	Primiparity	Primiparity
Social Status :	Class V	Class V
Ist antenatal booking :	18 weeks	15 weeks
Family history of hypertension :	Nil	Nil
Total No of antenatal visit :	10	11
Total No of visit last 2/12 of pregnancy :	7	6
Mode of delivery:	NBF	LSCS
Period of gestation at termination :	39 weeks	36 weeks
Foetal outcome : (birth weight)	Alive (3.05kg)	Alive (3.93kg)
Type of Eclampsia:	Intrapartum	Intrapartum

Out of these 7 and 6 respective visits were during 2 months prior to termination of pregnancy. Both had no family history of hypertension and there was no increased blood pressure noted during the pregnancy. The eclampsia occured in the intrapartum period. One of them had to undergo emergency LSCS at 36 weeks of gestation while the other had forceps delivery at 39 weeks of gestation. Both of them delivered live infants with birthweight of 3.935 kg and 3.05kg respectively. Detailed analysis of the cards showed that in both the women there was an excessive and sudden weight gain during the pregnancy. Furthermore the cardinal signs of PET such as ankle oedema were present eventhough proteinuria was only present in one of the women.

CHAPTER VI

DISCUSSION

Hypertensive disorders of pregnancy (HDP) and particularly eclampsia with its many pathological sequelae are still a major problem that cause maternal and foetal wastage in most parts of the world and Malaysia is no exception.

The incidence of HDP is influenced by the characteristics of the mother, including her age, parity, and genetic make-up. Another influencing factor is her environment, including social class, and in addition the incidence is also influenced by the availability and utilisation of health services (3).

The incidence of HDP in this study is 2.5% among all the pregnant mothers attending government health clinics. This incidence does not reflect the true incidence for the district, as the study does not include cases of HDP seen at government hospitals or private clinics in the district. Nevertheless this is comparable to the studies by Siti Norazah et al at University Hospital where the incidence of HDP in 1981-1984 ranged from 2%-4% (8).

The incidence however, is slightly higher, as expected, compared to the developed countries where a study done by Andersh B et al at East Hospital Goteberg, Sweden showed an incidence of 1.5% (20).

Based on this study of the pregnant women with HDP in the district of Kuala Muda it is observed that the Malays have a higher incidence of HDP compared with other ethnic groups. Although the Malays make up of about 60% of the total population in this district, the percentage of Malays among the pregnant women is far greater accounting for 90%. This implies that more Malays seek antenatal care at the government clinics compared with other ethnic groups especially the Chinese who prefer the private clinics or hospitals. This could partially explain why incidence of HDP in Malays appear to be higher in this study.
However, Chan (1974) in a review of 513 women with HDP in the University Hospital in 1972-1973 also found that the incidence of HDP was significantly higher among the Malays eventhough the study done was in an urban area (18).

It is well known that HDP is associated with extreme ages of young and older age groups. In this study it is noted that the incidence of HDP increases progressively with age and the peak being in the age group of above 40.
A study done at University Hospital by Chan (1974) found that older age group of 35-39 years has a higher incidence of HDP, compared to other age groups (18). The possibility that, these older women who manifest as having hypertension during the pregnancy are in fact the potential candidates of essential hypertension in later part of their lives,

for it is the fact that the prevalence of essential hypertension increases with age (6,24).

Many studies, for example Hall and Campbell in Aberdeen and Wong et al in Singapore have observed that HDP is predominantly a primaparous disorder (14,17). Contrary to this, it is observed in this study, that there is no difference in the incidence of HDP between primiparous and multiparous women. The contradiction can be partially explained by the fact that in this study there are many women who are grandmultiparous and are in the advanced age group. As mentioned earlier older age group is associated with higher incidence of HDP. Therefore it is the age factor and not the multiparity which could be responsible for such results.

Nevertheless, the two cases of eclampsia noted are among the primiparous women indicating that primiparity is still a higher risk group that needs special care.

The low socioconomic class are said to suffer a higher incidence of HDP. All the women in this study are homogenously in the lower social class IV and V.

It is said that the social class effect on HDP is most probably a reflection of access to medical care as these group of people have poorer availability, utilisation and quality of medical care especially the antenatal care. In this study poor utilisation of services is reflected by the

fact that 83.4% of the women made less than the recommended number of antenatal visits.

Several factors that predispose to the development of HDP have been identified. In this study, the majority of the women had at least one of the risk factors. The exterme age and primiparity made up the main risk factors followed by women who had history of PET or eclampsia in previous pregnancy. Women with past history of PET or eclampsia have a 13-45 % chances of recurrence of PET with subsequent pregnancies (3). The identification of these women who have the preexisting risk factors will help the health provider to follow them up more closely in order to detect early signs and symptoms of impending PET and hence effective remedial can be instituted.

In this study, hypertension developed during pregnancy (PET), is the commonest type compared with hypertension that antecedates the pregnancy i.e chronic hypertension either with or without superimposed PET which made up a small proportion. These findings are similar to those of other studies done elsewhere in which it is shown that chronic hypertension contributed only about 1%-18.5% of the total HDP cases (22).

The mild form of HDP with the diastolic blood pressure of 90-99mmHg seem to make the largest percentage of the study

group (70.8%) compared with other forms of severity. This could be due to the antenatal care given to the mothers. Although majority of them did not make the ideal number of antenatal visits, average number of visits were 7-8. This frequency may be sufficient for health staff to monitor and control HDP from advancing to severe form.

In this study more than two thirds of the women (74.1%) made their first antenatal visit during the second trimester and on an average made 7-8 antenatal visits during the entire pregnancy. The Ministry of Health however requires that every pregnant woman and more so if she is a high risk mother to make the minimun of 10 antenatal visits for satisfactory antenatal care. In this study nearly 1/3 made less than 6 visits and another 53.8% made less or equal to 10 visits. Importance of early antenatal checkup is to establish the baseline blood pressure which is more or less will be near to the pre pregnancy stage. It is important also to note that the definition of hypertension in pregnancy besides being the diastolic blood pressure of more than 90mmHg, it also includes that the difference in the systolic blood pressure should be of 30mmHg and the diastolic blood pressure of 15mmHg. Baseline blood pressure in some women before conception may be as low as 90/60 mmHg and during pregnancy may go up to 130/80mmHg. In this case she has a rise of 40mmHg of systolic and 20mmHg of diastolic blood pressure. If her baseline blood pressure is not known she may be

misdiagnosed and labelled as normotensive and may end with the disastrous effect of PET including eclampsia.

It is essential that pregnant women make a minimun of 4 antenatal visits during the last two months of pregnancy so that their condition can be monitored and appropriate measures can be instituted in order to modify the severity of the HDP. In this study, about 1/3 of them made less than 4 visits to the clinics during the last 2 months of the pregnancy which is considered to be not satisfactory. Wong et al in a retrospective study on 597 cases of HDP in Kandang Kerbau Hospital in Singapore took at least 3 antenatal attendances during the two months preceeding the delivery as an indication of satisfactory care and in their study they showed that those women who made less than 3 antenatal visits tended to develop a more severe form of HDP, and they concluded that satisfactory antenatal care during the last two months of pregnancy plays a major role in modifying the severity of HDP (14).

The high risk mothers are advised to deliver in the hospitals which have adequate facilities to handle any problems or complications that may arise during delivery. Eventhough in this study majority of them delivered in the hospital, but there is still a small percentage (9.3%) of mothers who delivered at home unattended by trained medical personnel.

Thus more health education is needed in order to persuade high risk mothers to deliver in hospitals.

The methods or mode of delivery in the study showed that, instrumental delivery was low (13.8%) compared with other studies. For example, Bjorn Andersh et al in a retrospective study of 261 women with hypertension in pregnancy noted that instrumental delivery, was high (35%) especially with severe PET (20). This differnce could be explained by the fact that a majority of the women in this study have mild HDP with the diastolic blood pressure of between 90-99 mmHg, thus they may have been allowed to have spontaneous vaginal delivery rather than undergo an instrumental intervention which is associated with it's own risks. Instrumental delivery in HDP is done if it poses a threat either to the mother or to the foetus. Ideally all mothers with HDP should be assisted in the second stage of labour. This is to shorten the second stage and thus help to reduce the maternal effort which otherwise will further elevate the blood pressure and hence precipitate eclampsia. The process of labour itself may trigger off eclamptic convulsions as explained above (25).

Whenever the toxaemic process is severe or is of long duration, placental insufficiency supervenes. Hence, any infant exposed to such risks is faced with poor foetal outcome such as low birthweight, prematurity and it's complications. In this study, more than half of the infants delivered to women with severe form of HDP have poor foetal

outcome compared with less than 1/4 in women with milder form of HDP. It is also shown that, earlier onset of hypertension in pregnancy results in more severe form of HDP and hence the unfavourable outcome to the foetus. Findings in this study confirm the above statement that 40% of women who developed HDP before 28 weeks of gestation had poor foetal outcome compared with only about 14% of women with onset of HDP after 28 weeks of gestation. Wong et al in their study also found that when the onset of hypertension occurred at or before 28 weeks gestation, the pregnant women tended to develop a more severe form of the disorder and hence resulted in poor foetal outcome (14). Another factor that has been shown to affect the outcome of the foetus is the presence of protein in the urine. Studies by Sergio Ferrazzani et al and Wong et al demonstrated that with the presence of proteinuria, perinatal mortality was four times higher and was associated with an increased rate of small-for-date infants (19,14). Our findings also show that foetal outcome was poor in women with proteinuria during pregnancy compared with those without proteinuria. Proteinuria is always an important finding, even in trace amounts and is commonly the last of the three major signs of PET to appear. The presence of proteinuria could be considered as a clinical late marker of the vascular damage in PET that could be responsible for the plasmatic protein escape either in the urine or in the interstitial space (19).

Period of gestation at termination of pregnancy also plays a role in determining the foetal outcome. For those who delivered at a gestation of 36 weeks or less, as shown in the study by Wong et al, the perinatal mortality was 15 times higher than those who delivered at term (14). In this study, all (100%) of the infants who were delivered before or at 36 weeks of gestation had poor outcome either resulting in prematurity, perinatal death or low birth weight.

As regards to maternal outcome, there were no maternal deaths as a result of HDP in this study. But HDP is still one of the leading cause of maternal deaths in some countries, as shown by Turnbull (1987) in England and Wales from 1952 to 1981, HDP is one of the four main causes of maternal deaths (17). World Health Organisation in the annual report of 1972 also showed that HDP still ranked among the first defined causes for most countries (3). In Malaysia, the maternal deaths due to HDP showed that, it is progressively coming down from 13.2% in 1981 to 7.8% in 1987 (11). As mentioned earlier, this could be attributed to the improvement in the antenatal care of the mothers as the years have gone by. There were also no maternal morbidity that were recorded in this study except for two cases of eclampsia that occured during intrapartum period. Both of the eclamptic cases are primiparous women and are between 23 to 24 years old. Study done in Nigeria between 1968 to 1987 on 788 cases of eclampsia also showed that a high proportion (67.9%) of the

eclamptic patients were primiparous and the highest incidence of eclampsia occured in the age group of 20-24 years (15). Both the cases in this study showed no elevation of blood pressure throughout the pregnancy. They had a satisfactory number of antenatal visits and came for the first booking during the first trimester. Significant findings were that in one of the cases, at one time of her pregnancy, protein was present in the urine eventhough in traces.

Other findings were that in both of these women there was an excessive and sudden weight gain that ranged between 13.5-14.5kg compared with the estimated expected weight gain of 9.5-10kg. In addition to this in both of these women ankle oedema was also noted. In spite of these findings the cases were not identified as high risk cases and hence were not referred to the hospital for further management by the more skilled personnel. Thus the fact that the two mothers had made required number of antenatal visits to the clinics, with the first booking in the first trimester and had fully utilised the health facilities available and were monitored by health staff, but eclampsia still occured.

There are several reasons to account for the eclampsia. Firstly, both of them may be undiagnosed cases of PET, but for some reason or the other the increase in the blood pressure was not detected.

Secondly, women vary in their susceptibility to convulsions and some stimulus such as the labour itself that trigers off the convulsions.

Lastly, there are cases where eclampsia develops without any signs or symptoms of impending PET during pregnancy. This is the variety which may be difficult to detect early to prevent eclampsia.

CHAPTER VII

CONCLUSIONS AND RECOMMENDATIONS

From the study on the pregnant women with HDP in the district of Kuala Muda there are few things that can be deduced.

Firstly, the incidence of HDP increases progressively with childbearing age.

Secondly, there are well establised and recognised risk factors that are associated with HDP, noticebly in this study are extreme age of childbearing especially above 35 years old, past history of PET and eclampsia.

Another deduction that can be made is that, majority of the pregnant women make their first antenatal visit only in the second trimester and not as early as they know they are pregnant, as required.

It is found that factors affecting foetal outcome among others include the severity of HDP, presence of proteinuria, period of gestation at onset of hypertension and termination of pregnancy.

Lastly, the early signs and symptoms of impending PET such as excessive and sudden weight gain and the cardinal signs of PET including oedema and protein in the urine eventhough present in traces were ignored which lead to the disastrous end-result of PET culminating in eclampsia.

The following recommendations are then proposed in the hope that they can be helpful and useful in improving the overall management and care of women with HDP and ultimately towards more favourable foetal and maternal outcome.

Presently, the Ministry of Health through the High Risk Approach has introduced in June 1988 the tagging system with a range of colours to signify various risk factors present in the pregnant women and the protocal for their management. But the list does not include past history of PET and eclampsia. A mother who had PET or eclampsia in her previous pregnancy, has a 13-45% chances of recurrance in her current pregnancy. Thus it may be useful to add this to the existing list so that special attention would be given to such mothers. Another factor that needs to be included in the list is excessive weight gain. By doing this the first-line staff such as midwife and community nurse would become more aware of interpreting weight gain and would then refer them to the appropriate level for further management.

Primiparous women should be seen more frequently preferably by the doctor either at the health centres or at the hospitals more so during the last trimester. Presently, the doctors do routine checkup only twice, once as soon as the woman registers in the clinic and the second around the 36 weeks of gestation in all uncomplicated cases but now it is worth considering for the doctors to closely monitor the

pregnant at an age or achieving a parity that carries additional risks.

Lastly, there is a need to study why women develop sudden intrapartum eclampsia without showing signs and symptoms of PET during pregnancy. Are there any deficiencies in the detection of PET during the antepartum period or are there any biomedical causes which are not known. Therefore it is recommended that further studies be undertaken to assess the quality of antenatal care and also to explore the biomedical causes of sudden eclampsia.

CHAPTER VIII

SUMMARY

The HDP particularly eclampsia, is one of the common and major complications in pregnancy. The aetiology of this condition is still not fully understood. Even in developed countries this obstetrical enigma is still one of the leading causes of maternal and foetal morbidity and mortality. Good antenatal care with close monitoring of the mother and foetus decreases if not totally prevents the occurances and frequency of this condition.

As Kuala Muda has been an outlier district for eclampsia in 1989 thus a descriptive crosssectional study of pregnant women with HDP who attended the government health clinics in 1989-1990 was carried out from 16-30th December 1990.

In this study, out of 4284 pregnant women who delivered during the period of Jan-Nov 1990, 108 or 2.5% of them are found to have HDP.

The highest frequency of HDP is noted in the Malays and the incidence increases progressively with age.

Primiparous women are equally affected as the multiparous women and all of them are of lower socioeconomic class.

Among the risk factors that are identified in these women are extreme age of childbearing especially of 35 years, primiparity, past history of PET and eclampsia, chronic

hypertension, family history of hypertension and twin pregnancy.

The most common form of HDP was PET followed by chronic hypertension and chronic hypertension with superimposed PET. There were two cases of eclampsia.

Majority of the women had mild form of HDP with the distolic blood pressure ranging from 90-99 mmHg. Majority made their first antenatal visit to the clinics in the second trimester with an average of 7-8 visits during the entire pregnancy. However, during the last two months of their pregnancy, majority had made a satisfactory antenatal visits to the clinics.

Most of them delivered in the hospitals and had spontaneous vaginal delivery while only a small percentage of them resulted in instrumental intervention either LSCS, NBF or vacuum extraction.

The foetal outcome is affected by a number of factors including severity of HDP sufferred by the mothers, period of gestation at onset of HDP, presence of proteinuria and period at termination of pregnancy.

Lastly, eventhough majority of the women with HDP did not develop any serious maternal complications, but two of the primiparous women with no increase of blood pressure during pregnancy developed intrapartum eclampsia .

It is recommended that past history of PET and excessive weight gain are included in the high risk lists presently used in the ministry.

Closer supervision and regular in-service training to health staff will improved the quality of antenatal care provided to pregnant women.

Emphasise on health education on the importance of early antenatal booking and family planning coupled with good antenatal care given to the pregnant women with HDP will improve the maternal and foetal outcome eventhough there are cases where eclampsia cannot be totally prevented, for which further research is recommended to identify reasons for unexplained eclampsia.

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APPENDIX I

Definitions

1. Maternal Death

   A maternal death is defined as the death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and the site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management but not from accidental or incidental causes.

2. Stillbirth

   Foetal death occuring after the 28th completed week of gestation (period of gestation being measured from the beginning of the last menstrual period).

3. Perinatal Mortality

   Late foetal (stillbirths) and early neonatal deaths i.e., it includes deaths between the 28th week of pregnancy and end of the first week after birth.

4. Term baby

   Baby with gestational age between 37 weeks and 40 weeks calculated from the first day of the mother's last menstrual period (LMP).

5. Prematurity

Delivery that occured before 37 weeks period of gestation.

6. Risk factor

The factor known to adversely affect the pregnancy outcome and or survival chance of a newborn.

7. Low birthweight

Babies whose birthweight were less than 2500 gms.

8. Perinatal Mortality Rate

$$\frac{\text{Stillbirths and deaths under one week}}{\text{Total live and stillbirths the same year}} \times 100$$

9. Abortion

The spontaneous or induced expulsion of the foetus before 28 weeks of gestation.

10. Parity

The number of times a woman has delivered a foetus of 28 weeks or more, regardless of whether the foetus is alive or dead at the time of delivery.

APPENDIX II

ANTENATAL CARD

KIK/1/74 Pindaan 1

KAD PRANATAL

No. K.P. IBU: _____ PUSAT KESIHATAN KECIL

Klinik: _____ Tarikh: _____

Nama: _____ Bangsa: _____

Tarikh Lahir/Umur: _____ Pekerjaan: _____

Alamat: _____

Nama Suami: _____ Pekerjaan Suami: _____

Tarikh Perkahwinan: _____ Gravida: _____ Para _____

PERIHAL KANDUNGAN LALU:

Bil	Hasil Kandungan	Tahun	Tempat/Bidan	Jantina Bayi	Komplikasi	Keadaan Sekarang

Amalan perancang keluarga yang lalu:

PERIHAL KESIHATAN LALU:

	Tibi	Kencing Manis	Darah Tinggi	Lemah Jantung	Meroyan	Lain-lain
Ada						
Tiada . .						

PERIHAL KANDUNGAN SEKARANG

Bidan yang ditempah: _____ THA: _____ TAL: _____

Jangka masa mengandung: _____ Tempat: _____

KEADAAN KESIHATAN SEKARANG: Kesihatan Am

Pergigian: _____ Berat Badan: _____ HB: _____

Urat Timbul: _____ Tekanan Darah: _____ Kumpulan Darah: _____

Jantung/Paru: _____ VDRL _____ Lain-lain _____

KEADAAN KAWASAN SEKELILING: PELALIAN TETANUS TOXOID 1. 2.

Keadaan Rumah—

Tandas: _____ Ganti Udara: _____

Bekalan Air: _____ Simpanan Makanan: _____

Saluran air limbah: ☐ Ada: Terbuka/Tertutup ☐ Tiada

Pembuangan Sampah:

☐ Dikambus ☐ Diangkat

☐ Dibakar ☐ Tidak memuaskan

☐ Lain-lain

KELINIK/ LAWATAN RUMAH	PEMERIKSAAN							PEMERIKSAAN LAB				MASAALAH	NASIHAT/RAWATAN	Tarikh Lawatan Akan Datang
	Berat Badan	Tekanan Darah	Buah Dada	Jangka Masa/ Tinggi Rahim	Kedudukan Janin	Jantung Janin/ Gerak Janin	Kaki Bengkak	Kencing		HB	Lain-Lain Buist			
								Albumin	Gula					

REKOD NATAL

Kelinik:_____ No. K.P. IBU:_____

Tarikh Bersalin:_____ Tempat Lahir:_____

Keadaan Ibu:_____ Jumlah Panggilan:_____

Keadaan Bayi_____ Berat Lahir:_____

JAGAAN POSTNATAL

	Lawatan Ke Rumah (20 hari)	Lawatan Ke Kelinik (42 hari)	Nasihat Pemakanan Perancang Keluarga
Tarikh			
Suhu Badan			
Berat Badan			
Tekanan Darah			
Buah Dada			
Aliran Susu			
Aliran Vagina			
Tinggi Rahim			
Kaki Bengkak			
Kurang Darah (HB)			
Air Kencing Alb.			
Air Kencing Gula			
Pemeriksaan Vagina ..	Kemaluan		
	Episiotomy/Luka		
	Rahim/CX		
	Adnexa		

CATITAN:_____

Terima Perancang Keluarga: Ya/Tidak Cara:

Menyusu Bayi: Susu Ibu/Susu Botol

RINGKASAN LAWATAN

Masa Mengandung	Jumlah Lawatan ke Kelinik	Jumlah Lawatan Ke Rumah
0-27 minggu		
28-35 minggu		
36 + minggu – Natal		
Post Natal		